Conservation and Management of Common Terns in the Western Great Lakes

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Introduction

Fish-eating birds are known to be at great risk of exposure to mercury, which has been linked to reduced reproductive success, behavioral changes, and motor skill impairment (Grasman et al. 1998, Evers et al. 2011). The Great Lakes region is widely contaminated with mercury, primarily due to human-related atmospheric emissions (Evers et al. 2011). Many coastal regions of South America are also considered mercury hotspots due to artisanal and small-scale gold mining (Lavoie et al. 2014, Evers and Buck 2015). Band recoveries suggest that Great Lakes Common Terns winter in coastal areas of Central and western South America, and are therefore likely to be exposed to high levels of mercury throughout the year. To determine if mercury is a concern it is important to evaluate year-round exposure.

Summary of Objectives

Our primary objective is to increase our understanding of factors that influence colony productivity and survival of Common Terns (*Sterna hirundo*) breeding in the Western Great Lakes region. Our goal of identifying factors that influence productivity and survival includes assessing methylmercury concentrations attained during both breeding and non-breeding seasons for adult and hatch-year (HY) birds. Collecting biological samples necessary to determine methylmercury concentrations was the primary objective supported by the MOU Savaloja Grant.

Methods

Capture and Handling of Birds

Capture and handling of Common Terns followed protocols approved by federal and state agencies (Bird Banding Lab, Wisconsin DNR and University of Minnesota Animal Care and Use Committees). Adult birds were captured using a box trap made of welded rectangular mesh wire (Burger 1971), which was placed above a nest where a bird was incubating eggs. When a bird returned to its nest to incubate eggs, we collapsed the box trap and immediately retrieved the bird (Silvy 2012). Maximum handling time for each adult bird was roughly 15-20 minutes, which includes the time necessary to draw blood. Because HY birds are not able to fly for several weeks, we are able to capture young birds by hand and place them in a tall cardboard box, to prevent them from escaping while they were handled and to reduce their exposure to heat or cold. Handling time for HY birds was roughly 3 minutes. Field work was only conducted during favorable weather conditions to minimize exposure-related adverse effects on eggs, chicks, and adults.

Capture of adult Common Terns using a box-trap method. (Photo credit: S. Matteson)

Capture and handling of hatch-year Common Terns. (Photo credit: MNDNR)

Biological Sampling

During the 2016 breeding season (May-July), we collected blood, feather, and non-viable egg samples from Common Terns on both Lake Superior breeding colonies; Interstate Island in the Duluth-Superior Harbor [46º44'57.87" N, 92º6'35.77" W] and Ashland Island, Ashland, WI [46º36'26.07" N, 90º52'12.33" W]. Samples were collected following the methods of Evers et al. (2009). I collected blood samples from 18 adult birds on Interstate Island, 30 feather samples from adults on each island (*n*= 60), 60 feather samples from HY birds on each island (*n*=120), and 30 non-viable eggs from each island (*n*=60).

Collecting blood and feather samples from adult Common Terns on Interstate Island. (Photo credit: F. Strand)

Results

In September, all samples collected during the 2016 field season were shipped to the Biodiversity Research Institute (BRI), Gorham, Maine, for analysis. We expect to receive results in February and will then be able to assess differences in exposure on the breeding grounds (blood, feather, eggs) as well as during the non-breeding season (adult feathers) between the two nesting colonies. We will incorporate these results into models of colony productivity and age-specific survival, which will be part of a larger project supported primarily by the U.S. Fish and Wildlife Service. We anticipate completion of the entire project by 2018.

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Appendix A. List of expenditures.

Supplies	**$**	**150.00**
Needles x200	$	20.00
Hematocrit tubes	$	20.00
Tube closures	$	10.00
Vacutainer x10	$	30.00
Coagulant	$	10.00
Cooler x2	$	25.00
Freezer pack x4	$	25.00
Plastic bags	$	10.00
Services	**$**	**755.00**
Blood processing	$	675.00
Shipping costs	$	75.00
IDC	**$**	**471.00**
TOTAL	**$**	**1,376.00**